

# ***Thinkpiece***

## TRUE SPIRITUALITY IN THE LIGHT OF THE SCIENCES

*by Ralph Wendell Burhoe*

*Abstract.* Spirituality emerges in the function of culture to reinforce and yet redirect our genetic heritage. Our genes urge us to be concerned only for our own welfare, which can turn us to evil behaviors. Our religious traditions urge us to engage in behaviors of transkin altruism. These religious traditions have been selected for in the processes of natural selection. The challenge to spirituality is to discern the fundamental dynamics of the evolutionary processes, both genetic and cultural, that have created us and to direct our behaviors in ways that can be beneficial to the entire natural system. Reason is not enough; we must also cultivate spiritual discernment in order to perceive the true nature of our situation and the best responses that are called for. The religious communities have the major responsibility for cultivating the spirituality that can achieve the most adequate discernment.

*Keywords:* Donald Campbell; culturetype; genotype; selfishness; spirit; spirituality; E. O. Wilson.

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In a conference seeking to advance the effectiveness of a religious institution, the attempt to understand spirituality in the light of the sciences would seem at first thought to be a ludicrous mistake. Does not everyone know that science can say nothing for religion?

I say religious institution, even though some of our liberal churches and fellowships may sometimes more properly be called lecture halls for adult secular education or political propaganda, or social-service agencies, or psychotherapy referral offices, or game and party halls, or restaurants, or some other type of secular leisure-time agency, not necessarily made spiritual by a steeple or pipe organ associated with its building. But for more than sixty years I have heard Unitarian and Universalist churches referred

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to, by insiders as well as their neighbors, as religious institutions to enhance our spiritual life. That part of a long history represents my view. So I am taking religion and spirituality seriously.

I am aware, however, that many religious leaders feel it a mistake if not an impossibility to examine spirituality scientifically, especially if our aim is to encourage serious interest in it. Our personal experience and our understanding of history suggest that, during the several centuries of the rise of the modern sciences, most of the impacts of science from Galileo, Darwin, Marx, and Freud—from the physical to the psychosocial sciences—have tended to wither faith in traditional religious beliefs. One can symbolize this history by noting how science has dispelled our beliefs in ghosts pretty thoroughly, and by remembering that *ghost* is our Anglic term for the Latin-derived term *spirit*.

This fading or withering of spirits and ghosts in the light of the sciences seems to have spread broadly through the educated public. Ghosts, spirits, and gods (holy ghosts or spirits), according to most enlightened people with whom I have talked in the past sixty years, are to be discarded as we grow out of our personal or historical childhood. We say we should become mature, and if we have any religion our religion should be a more mature one like that already commended in the higher levels of the biblical religion by the prophets of Israel and Jesus of Nazareth: not a religion of vain rituals but a religion of moral justice and social concern, lived out in actions to insure that this justice and loving care for our neighbors are put into practice to bring the quality of life in this world closer to the ideal of heavenly life. Good religion is evidenced by its fruit: good behavior. If we are only hearers of the word, and not doers, we are but imperfectly religious.

Being of an enlightened and scientific frame of mind, I remain an advocate of such a mature religion. But my science itself raises a caution. Some of its new psychosociobiological anthropology tells me that mature adults cannot continue to have life if they throw away the essential realities of childhood. We still need the bone and also the brain structures built in us during childhood. This includes certain foundational elements of the ritual and mythical traditions enculturated in our brain structures. They shape our cognitive and behavioral responses in ways that have subtly raised us from ape-man mentality to socialized human beings. Moreover, my science tells me that ghosts are indeed necessary. The only problem is to discover and believe in ghosts that are as valid or useful as the invisible forces (gravity, magnetism, etc.) imaged in the scientific world view.

Some religious liberals, wishing to be genuine and noting traditional sacred forms and beliefs that have not been clearly or honestly articulated with their modern world view, conclude they are no longer necessary. For motivating ethics they assume that, since humans naturally want to do what is good, all we need do is provide occasional reminders and encouragement to do good, especially by setting a good example. While there is

merit in this, it fails to note what most of the world religions have long noted, and now the sciences: that the highest forms of human virtue are no more innate than the ability to talk. We do not expect chimpanzees to speak fluent English, because they lack the necessary genetic and neural information; neither do we expect (nor do we find) human children to speak English or any other language, if they have not lived where the language skill was specifically and effectively transmitted through a sociocultural heritage.

What the theory of the innate goodness of people failed to note is that the higher levels of human goodness are only native if the natives grew up in a culture that provided them with the right information. We recently have gained new scientific insights into the fact that visions of what is good, and the internal motivations to behave that way, are, like languages, dependent upon the heritage of very specific, culturally communicated information suitably coadapted to the genetic information in the population. While there are very essential genetic components for motivating good human social behavior, it has become clear that human concern for strangers, beyond the kin group, is generally not heritable without the right kind of culture.

At primitive levels, the cultural information necessary to make us human is communicated, without the need of too much cognitive content, by a society's heritage of the modifications made by its mores upon its genetically programmed rituals. Primitive ritual communication in animals, including kisses, smiles, hugs, growls, shouts, slaps, bowed heads, etc., is basically programmed by genes. The genetic programming of the inner brain provides the basic level of the meaning to both sender and receiver of these animal-ritual communications, and similarly provides a basic level of meaning in human communication.

This level of meaning remains the essential ground upon which higher levels of meaning are built in later stages of human development. At a more advanced stage of the evolution of humans (and of the development of children), the culturally transmitted information that humanizes us is communicated by the more complex linguistic symbol systems which have emerged only in human beings, so far as we know. In primitive stages of linguistically transmitted culture, networks of "well-winnowed" myths have extended the meanings of animal-ritual-level messages, providing spiritual meaning at a new level of verbally connected cognitive understanding. "Well-winnowed" is psychologist Donald T. Campbell's phrase, in his pioneering writings on sociocultural evolution, to signify the residues of culturally transmitted information that have stood the test of time because they served to advance their possessor societies to greater viability than competing societies with less viable information.

It is this cultural level of "natural selection" of myths, by the longer survival of sociocultural systems possessing them, that has given some myths

a truth value or validity in ways akin to the natural selection of the wisdom in our genes. We have come to understand that many aspects of our culture are developed by natural selection of this type to high degrees of wisdom long before we had the capacity consciously or logically to modify our culture. At later stages in the hierarchy of levels of cultural evolution (and at the later stages in the education of children and adults), the earlier stages are not so much replaced as they are supplemented by still more advanced levels of cognitive information that uses well-tested philosophy or science and satisfies advancing minds that the basic wisdom of evolved religions is indeed essentially true—or perhaps needs some modification for better acceptance in the context of the more advanced cognitive world into which they have evolved.

We have thus traced in outline some levels in the hierarchy of being which recent science has uncovered in the nature of life and the world. Evolution and individual life are such that the basic structures of the early stages are seldom entirely outgrown. Rather, the early stages become the platforms on which further stages of development are built by suitable modifications or additions to the information inherent in them. What happens and must happen to advance to maturity, is that the earlier stages can seldom be significantly altered or discarded, but must be supplemented by overlays of new levels in the hierarchy of information structures that shape the patterns of life. Some of you, especially those involved in religious education, may have become acquainted with this lesson from a modern synthesis of biological, psychological, and cultural evolution and human development from your acquaintance with the work of Jean Piaget, Lawrence Kohlberg, James Fowler, and others.

But we need to look at a still larger synthesis of the knowledge coming out of the sciences on the nature and place of man in the scheme of things, before we can have a contemporaneously effective understanding of spirituality, its proper role in our lives, and of our church's function in the necessary task of enculturating or educating people so that they will naturally want (or volunteer) to do good. We need to be aware that this task is set for us by the fact that we humans are genetically as fully programmed by "selfish genes" as are our chimp and gorilla cousins, with whom we share 99% of our genes, and that we have evolved in such fashion that we have to cultivate our highest moral and intellectual culture in that soil. In addition to genetics, we need also to look at the evidence from various psychological, neurological, ethological, and other findings that show us how our development from our genes is governed by various new, socially transmitted restraints and opened to widely expanded potentialities.

To start with a picture of the genetic limitations, let me read you a paragraph from *The Economy of Nature and the Evolution of Sex* by M. T. Ghiselin, which was quoted by Campbell in his presidential address to the American Psychological Association in 1975 (see *Zygon: Journal of Religion*

*and Science* 11 [1976]: 167–208), to communicate the seriousness of the problem of selfish evil in our nature:

The evolution of society fits the Darwinian paradigm in its most individualistic form. Nothing in it cries out to be otherwise explained. The economy of nature is competitive from beginning to end. Understand that economy, and how it works, and the underlying reasons for social phenomena are manifest. They are the means by which one organism gains some advantage to the detriment of another. No hint of genuine charity ameliorates our vision of society, once sentimentalism has been laid aside. What passes for cooperation turns out to be a mixture of opportunism and exploitation. The impulses that lead one animal to sacrifice himself for another turn out to have their ultimate rationale in gaining advantage over a third; and acts “for the good” of one society turn out to be performed to the detriment of the rest. Where it is in his own interest every organism may reasonably be expected to aid his fellows. Where he has no alternative, he submits to the yoke of communal servitude. Yet given a full chance to act in his own interest, nothing but expediency will restrain him from brutalizing, from maiming, from murdering—his brother, his mate, his parent, or his child. Scratch an “altruist,” and watch a “hypocrite” bleed.

This is a somewhat hyperbolic statement, which more careful scientific writing would have to modify. But it gives a vivid picture of what many have long suspected is essentially true about human nature.

Campbell’s response to this evil, built into human nature by the evolution of our genetic information, admitted that evidence from many psychosocial studies of human behavior tends to confirm the validity of the biologically based blood-curdling view of human tendencies to selfishness. He explained the overcoming of genetically programmed instinctive selfishness in humans as being accomplished by the operation of socially (not genetically) transmitted cultural information that had the power to alter ape-man behavior to the point of some degree of altruism. He pictured the accumulation of this wisdom and power of culture as taking place in sociocultural evolution by a process analogous and parallel to but different in detail from the evolution of genetic wisdom: a process of blind variation, natural selection, and retention. Religions have been selected in this sociocultural evolution. In the more successful human societies that have adopted and suitably transmitted this religious information, the behavior of individuals becomes internally motivated toward a social cooperation with nonkin conspecifics that is not found elsewhere in the animal kingdom.

Campbell, moreover, instead of crediting his psychosocial-science colleagues with the wisdom to generate a healthy and voluntary social cooperation and harmony, told them that “a major thesis of this address is that present-day psychology and psychiatry in all their major forms are more hostile to the inhibitory messages of traditional religious moralizing than is scientifically justified.” He further remarked about the religious traditions, well winnowed by natural selection through hundreds of generations of human social history, that “on purely scientific grounds, these

recipes for living might be regarded as better tested than the best of psychology's and psychiatry's speculations on how lives should be lived. This argument comes from a natural-selectionist theory of social evolution [and from a scientist who speaks] from a scientific, physicalistic (materialistic) world view." This is an overwhelming testimony of scientific findings about the power and worth of religion in both the hardness of the science involved and in the necessity and virtue of evolved religion.

There is much more to be said about this complex and fascinating story of how the sciences have been leading toward a new understanding of the significance of religion. Here I will only mention that an increasing number of scientists studying human and social nature have recently found new evidence for religion's essential role. For instance, pioneer sociobiologist E. O. Wilson (see the last chapter of his famous tome on *Sociobiology* or the whole of chapter 8 in his *On Human Nature*) views religion as having a biologically essential role in human nature, among other things making possible human altruism. You will also find more on this topic in various issues of *Zygon*. So let us not be too hasty in discounting the value of the sciences in teaching us about the meaning of religion and spirituality. Moreover, let us not conclude too quickly that scientific evidence merely adds to our liberal tendencies to debunk and hence to abandon ghosts and gods and traditional religious beliefs and practices. I am reporting on and representing a strong countercurrent to views often held in an earlier sophomore stage of scientific understanding of human nature and religion.

Before I say more about a scientifically credible and confirmable interpretation of spirit and a scientific guide toward a higher spiritual life, let us look for a moment at the traditional meaning of the term *spirit*, which has been an important one in our language. We want to interpret or translate into modern scientific terms as closely as we can an essential meaning of spirit. "The earlier English uses of the word are mainly derived from passages in the Vulgate, in which *spiritus* is employed to render [the Greek *pneuma* and Hebrew *ruah*]," according to volume 10 of the Oxford English Dictionary (1933, 1961 printing).

According to Van Austin Harvey's *Handbook of Theological Terms*, we find under "Spirit" that

*pneuma* is the Greek word most frequently translated in English as "spirit" and, like the English word it has an extraordinary number of related meanings. In the Bible, these meanings cluster around two poles, the spirit as a term for distinctively human life and for the dynamic activity of God. In the O.T., it is God's Spirit (*ruach*) that acts in creation, motivates leaders, imparts wisdom, discernment, and holiness, and that inspires the prophets. In short, the Spirit of God is the power and presence of God in the world. . . . It is the Spirit of God that vitalizes man so that man also may be said to have spirit or *ruach*. Spirit, then, becomes a term for the distinctive powers of man (intelligence, will, and emotion) and is synonymous with "soul" and "heart," which were the terms for the seat of human action and life. In the N.T. *pneuma* has roughly the same two meanings, the distinctive qualities of human life and the creative activity of God.

Now, after this brief sketch of some of the core meanings of spirit during two or three thousand years of our religious tradition, can we make sense of the term in the context of the scientific world view?

It seems quite clear that *spirit, pneuma, ruach*, and certain other words for breath or moving air, often came to be used very early, and still are used today, to designate or symbolize the largely invisible and scarcely perceptible realities or forces that were nevertheless the sources of action and of great significance for humans.

Spirit thus came to denote the invisible but necessary forces that account for a person's desires, feelings, general awareness or consciousness, and even to represent the secret of life itself, since breathing is itself evidence of the presence of the hidden forces that convert the dust of the earth into a living being. A body lying down is judged not to be dead but rather only asleep if it is breathing. Spirit or breath was used to symbolize forces that could not be directly or fully seen, or readily explained by mechanisms ordinarily apparent to vision and common sense, such as the visible entities and agencies of the human body or the environment.

Hence it is important to note that although the term spirit has always denoted something real, nevertheless, it denotes something more than what is usually called material, that is, something more than the entities that naturally appear directly or fully to the senses of vision and touch. From the importance of denoting more than the naturally perceived aspect of things, spiritual things were often called supernatural, where supernatural meant not the unreal but the ultimately most real. In Western Civilization or Christendom, until recent centuries, the Holy Spirit was the proper name for explaining the operations of the ultimate system of forces that creates and sustains all.

It should be remembered that a child or a primitive adult consciousness would tend to presume that the actions it observes are motivated like its own actions, by a conscious intent, whether the observed actions be those of its sister, father, a dog, a bug, a squeaking tree, a flowing stream, falling stone, or thunderstorm. Thus actions have implied to primitive minds an actor with an invisible anima, spirit, or soul possessed of a conscious intent, will, or personality akin to that of the observers, familiar with how their wills produce observable action. By analogy with what can be accomplished by pleasing family and tribal authorities, it was natural that advantageous adaptation to the will of unseen spirits would be sought by prayers and gifts.

However, in recent centuries the natural sciences also have investigated a world of vital forces and things just as invisible and intangible as those of the religious world of spirit. In some respects, the invisible forces investigated by the sciences have come to provide even more credible and useful explanations of the creation of the world and man and of man's nature and place in the scheme of things. Scientific models or concepts, although

equally ghostly, invisible, or spiritual, are radically different from those of traditional religions, even from the highly sophisticated Hellenized concepts used in Christianity. It requires a radical translation or transformation to interpret Platonic, Aristotelian, or biblical explanations of the history and structure of the system of reality in terms of modern science. These transformations in many cases are so great that any translator from one language to the other requires an expertise in both seldom attained today.

Nevertheless, recent science provides new explanations of why and how nature selected a wisdom for our psychosocial needs, even though the hidden forces described by the sciences, such as electromagnetic and other force fields (including those of DNA chains and socially transmitted cultural information), are not always as anthropomorphic as one might expect for forces imagined in the perspectives of one's personal or racial childhood. In the explanations on which I and some others have been working, this wisdom emerged as two coadapted bodies of information—one in our genes, the other in our cultures. Together they shape the rituals, customs, and myths of religions, from primitive to advanced, even though our ancestors were nearly unconscious of why and how this was happening. Not only do scientists, like Campbell, explain why the cumulative wisdom of religion is often wiser than either our common sense or instinctive wishes, but also how the major religious implications for human duty and hope are often more valid today (despite the prescientific state of their explanatory apparatus) than new therapies, often neither truly functional nor scientific.

For instance, the sciences confirm religious notions of our dependent creatureliness, our duties to the unseen powers (gods), to other people, and our ultimate meaning and hope in the scheme of things. Harvard astronomer Eric Chaisson concluded a paper on "Cosmic Evolution" by saying: "We are, in the very literal sense of the words, children of the universe," thus expressing an ancient religious view of man's creatureliness and our creator's power and grace (see *Zygon* 14 [1979]: 39). In this light we may properly paraphrase an ancient religious formula to the effect that our meaning, duty, and opportunity are to be found in forever seeking to adapt better to the requirements of our creator.

However, the sciences have only begun to learn about the intricate information-shaping webs of interaction embodied in our traditional religious ritual mores and myths, or about how they link our genetically programmed organic base with several intermediate stages of ritual, myth, and logic, links that have transformed small ape-man-kin-groups into large and potentially orderly societies of civilized human beings, thus creating a new level of life, one that transcends the animal kingdom. A scientific civilization will need to respect this wisdom of evolved cultural information as it respects that of the genetic information which shaped our precultural nature, ways, and resources.



Today scientific descriptions of us and our world have become the furnishings of the house in which the modern mind dwells. But, due to uneven development rates, the scientific concepts have not yet been utilized for understanding, interpreting, and aiding the still necessary functions of traditional religion: the cultural transmittal of man's information on and capacity for his higher level of adaptation—higher capacities, duties, and destiny in the scheme of things. These functions are still largely expressed in an archaic language that has become less than adequate for life today.

Almost imperceptibly the invisible forces, structures, and programs of *nature* pictured by the sciences have replaced in the modern mind the pictures called *supernatural* or spiritual, the earlier furnishings of the mind formerly adequate to carry the religious message. But now scientific concepts are needed and could be formulated to do the job. Sooner or later they will be. They already describe and explain things, and induce right behavior in some matters, more effectively for life in our scientific-technological world than the earlier spiritual formulations and teachings.

In addition to describing the creation story or evolution of the cosmos and life (the *nature* external to us), science today describes our internal *nature*. Science is becoming clearer even about the nature of conscious spirit or soul. Science increasingly describes the hidden patterns of forces operating in the ten billion neural cells in each of our heads, with their some ten trillion interconnections and still larger numbers of transformations of patterns per minute. These produce our behavioral responses, memory, and conscious experiences (including feelings, volitions, ecstasies and sorrows, loves and hates, intuitions and dreams, hopes and expectations), and other behaviors. The sciences are also describing the communication systems (epigenetics) between developing brains and genetic structures as well as among brains and our sociocultural organism and ecosystem, thus giving us new insights into the nature and significance of our consequent learning or development both in our conscious and unconscious domains.

Even though the theological community has not yet become clearly aware of this, the sciences are now providing very clear evidence that our spiritual history and experiences—even our scientific thinking—have their immediate source in the activities of our brains as shaped by interactions of their vast storage of information (from the ecosystem, genes, and culture) on how to maintain a viable living system.

While these new understandings of the external and internal hidden forces that created and sustain us, that judge our behavior and reward and punish us, are in some ways radically different from those presented by Plato and Aristotle, the writers of Genesis, Isaiah, the Psalms, the Gospel writers, and Saints Paul, Augustine, and Thomas Aquinas, and others, nevertheless, many of the major features of the earlier tradition, properly translated, interpreted, and represented in scientific symbols of reality, remain true and essential for us today.

The scientific community is as yet as uninformed on this as the theological community is uninformed on the scientific story. Authorities in each of these two cultures tend to think the reality portrayed by the other has little or no relation to theirs. But the findings of some of us at the Center for Advanced Study in Religion and Science, the Institute on Religion in an Age of Science, and *Zygon* have rediscovered in the light of the sciences the essential realism and continuing significance of the spiritual meaning and wisdom of the great religious traditions. We are beginning to speak scientifically about both the human spirit and the Holy Spirit. A scientific spirituality is aborning!

In closing, let me say something briefly that may be of especial help to liberal religion for understanding the necessary role of spirituality in generating the motivation for ethical behavior. This conference arose out of a special concern of members of the liberal churches for the relative virtues and dangers of two movements among us: our recently renewed interest in spirituality and our oscillating effectiveness in motivating social justice. While some believe there is a potential conflict between the movement to spirituality and the movement to social justice, I have pointed out the scientific evidence that motivation to social justice is a very difficult problem in all creatures with selfish genes, and I shall indicate briefly a scientific view of why religious education is important for generating the spirituality necessary to motivate the individual's concern for self-sacrificial contributions to social justice.

The modern scientific picture of the hidden forces (or Holy Spirit) that shape our destiny shows us that indeed our biological genes are selfish, and that there are no animals that build cooperating communities that are not built for the selfish gene. While this scientific picture is still challenged sometimes even on scientific grounds, nevertheless it is probably valid. Moreover it explains and supports the essential role of religion in my theory. So I accept it and work with it.

This picture means that natural selection seems to require that if any species is to evolve into a closely cooperating or altruistic community it will have to be one somehow composed of very close kin. Animals (including *Homo*) generally cannot be genetically programmed to be Good Samaritans, that is, to help strangers (non-kinfolk), because a law of the natural selection of genes tends to prevent it. (The isolated cases of animals who feed or otherwise aid other conspecifics than their own kin are explained for the most part as accidents that by chance occasionally "outwit" the genetically programmed mechanisms which seek to avoid giving such help except to one's own kin.) But humans can and sometimes do become Good Samaritans. How? Have they escaped the law of natural selection?

The secret by which nature or natural selection (or God, if you prefer traditional language) created humans, and made it possible for them to be

socially concerned and to cooperate far beyond the limits of genetic kinfolk, is revealed in the structure of the human brain, which in the account I have been giving is a scientific equivalent of the traditional human spirit or soul. This brain is informed not only by our genetic heritage but also by our symbiotically evolving cultural heritage. Religious cultures have extended our potential for altruistic cooperation outwards beyond genetically close relatives toward the potential good of the species, through a socioculturally common or shared system of goals or values.

In brief, as religious cultures evolved symbiotically with our genes, our brains came to house not only our *genetically inherited natures*, with all their species-specific but nevertheless uniquely variant impacts upon individual behavioral tendencies, but to house also, within the less genetically dominated outer layer or cortex of the brain, a socioculturally inherited nature, mostly acquired by the several levels of cultural instruction and learning after birth. This latter we may each of us share in essentially the same patterns (as in our language) with a large population, much larger than that of our genetic kin.

These two natures in each brain perforce had to be selected to be coadapted—so as to be separately heritable but symbiotically compatible packages of information. That is, the two separately inherited packages of information (the genotype for genetic and the culturetype for cultural information) in each organism had to have been selected on the basis that they would so interact that the products of their jointly programmed responses to organically internal and external stimuli would enhance the procreation of both the genotype and the culturetype simultaneously, through the life activities of the several organisms.

If the culturetype in my brain is closely enough related to the culturetype in your brain, and if each culturetype in each of our brains is suitably coadapted with its respective genotype, then, since in our culturetypic heritage we may have become closer kin than siblings, we thereby may be moved to risk our fortunes and our lives for one another as parents do for children or bees for the hive.

This is a new, scientifically grounded theory to account for the spiritual kinship that raises humans above the level of ape-men and all other animals. It accounts for our capacity to form the only large mammalian societies in which genetically nonkin individuals customarily cooperate, sometimes altruistically, to further common goals. Yet it is a theory that does not duck the law of natural selection that makes inherited information selfish for its own continuation. Rather it uses this law to illumine religion's extension of the self for which one is selfish into the population of a sociocultural organism by showing how each of any number of genotypes may be linked to a common symbiotic culturetype. Further details may be found in my *Toward a Scientific Theology* (Belfast, Dublin, Ottawa: Christian Journals, Ltd., 1981).

The inheritance of a religious culture, which is necessary in addition to our genes to shape our souls and our behaviors to be fully human, means that our civilized goodness is not innate in the genes, but must be added to genetic wisdom by a religious education, using that term in the broad sense to mean the ways whereby religions are transmitted through the impact of sociocultural practices and artifacts, from infant and childhood rituals on through various levels of oral tradition to a sophisticated theology for the mature members of the population.

Moreover, the theory requires that that religious education transmit a sound body of cultural information, which has the effect of coadapting (1) the totality of the culturetype with (2) the genotypes in the population, so as to shape an enduring pattern of life in the context of (3) the facts of the environment that affect that life. These three systems together constitute an ecological niche. It should be noted that religious education, as the value–(long-term-goal)–shaping agency of the culturetype, is where the significant innovation in adaptation is going on in human evolution. Our theory says that the area of cultural information which shapes the values of individuals (traditionally and properly called religious information) is the key element in making culture compatible with the ape-man gene pool, which is the other (symbiotic) source of our nature. Careful inspection shows, despite some recent misperceptions, that religious information is also a key element in adapting the individual, as well as a total sociocultural organism, into a harmonious or mutually beneficial fit with the external or environing segment of our ecological niche. The set of adaptive requirements presented by the total ecological niche are what in traditional religion has been called the will of the ultimate system of power, gods or God.

Insofar as this religious education is to be effective among persons who sooner or later will be educated to operate in the context of the scientific world view, it must provide a religious picture that remains compelling when the persons mature to enter that scientific world view. One reason why only about one in ten of those who undergo our religious education become adult adherents of our faith is that their religious education has been inadequate to meet their religious needs and at the same time to fit their world view as shaped by modern science.

Ethical, even altruistic, behavior can and has become the voluntary mode in societies whose institutions enculturate a true spirituality. Individuals in other societies, where socially good behavior has not been enculturated to be volunteered and so must be coerced by imposition or threat of superior societal power, cannot enjoy similar freedoms. The level of religion determines the levels of freedom in and power of state.

True spirituality is built on two coadapted levels or natures. These two natures are necessary to constitute a human being.

First is the genetic information, which shapes the lower or inner brain responses. Second is the religious cultural heritage, structured by religious

education (in the larger, cultural-anthropology sense of that term) in the outer layers of our brains. When the information patterns in both these levels are well coordinated or coadapted to each other and to the realities of the larger nature or ecosystem which created, sustains, and judges us, and holds the keys to our salvation, then we are truly blessed creatures.

To attain this felicitous state we need deep religious or spiritual experience. The experience may come in either of the following ways.

First, it may come from a long process of enculturation through a childhood and adult life within a community possessing a well-winnowed religious tradition. There exist such traditions that remain effective for some people even when they enter the context of the scientific world view. Individuals in such fortunate circumstances were called by William James, in his pioneering studies of the varieties of religious experience, the "once-born."

A second way, which James called the "twice-born," increasingly becomes necessary for those individuals who experience a significant cognitive and emotional dissonance between their earlier religious experience and a later stage of enculturation into a culture that is noncoherent or non-coadapted with the culture in which their earlier religion flourished. Religion, like marriage, is inherently an experience of considerable emotional depth, and hence conversion, or entering a new state of religion as in the case of the "twice-born," may involve great emotional stress (and its relief) as well as cognitive change. There is no less emotion for those in whom the cognitive change is very rich or sound than for those whose cognitive change is neither very deep nor sound. The explosion of scientific knowledge increases the proportion of the twice-born in our time. Our sector of the church traditionally has had a special responsibility to answer their need.

For those who are to be leaders in a highly cognitive level of scientific-technological society, the ideal religious education has not yet been adequately created, although Sophia Fahs and some others in the liberal traditions have made important contributions. We need to prepare a cognitively and religiously valid curriculum capable of generating in scientifically informed minds, or converting them to, convictions of the sacrality of a sound religion.

This is particularly necessary for those persons most critically involved in shaping the major transformations of our twentieth-century culture. Both they and the populations they lead, according to this theory, still need and always will need a sound religious enculturation to become fully human and voluntarily (freely, eagerly, joyfully) ethical. This kind of behavior can be natural for me only if I come to feel (for conscious or unconscious reasons) that new part of my essential nature, symbiotic with my genotypic body: my culturetypic nature, which includes God and you, for whom I am also selfish. Sociocultural sources concur it is OK to be selfish for (to love) God and spiritual brothers.

The kind of religiocultural information (culturetype) that has performed this function successfully in the past is as specific and carefully articulated a system of information as that in our genotypes. We who live in an era of largely dissolved religious faith forget that our forefathers already knew this importance of faith's subtle distinctions.

In addition to correct cognitive knowledge, to generate a viable spirit in populations, today as in the past, religious education must also give each unique brain the time and practice for the internal ritual of spiritual meditation. The brain requires this just as it requires sleep. Religious meditation allows the brain to sort out and reintegrate its internal structures so as to provide coherent meaning, hope, and sense of duty in the context of its unique genotype and daily floods of disrupting new information. One new bit may disrupt the previously stable patterns that shape the brain's own goals or hopes in the scheme of things. Restoration of a necessary peace of mind and hopeful purpose requires that the brain find a new integration or coherence. Brains are genetically programmed to seek such integration, but they require input of higher levels of cultural wisdom to attain higher levels of success.

Our rapidly changing, twentieth-century, sociocultural world is caught up in the most innovative and disruptive sociocultural transition in history. The disruption requires more time for the search for better-adapted spiritual insights. The scientific-technological environment requires a spiritual understanding or theology adapted to scientific understandings of reality. The advance of mankind to find a more harmonious and stable future in this context depends upon the advance of religious doctrine and education to fulfill new spiritual needs.

This will be accomplished through the generation and selection of some individuals and institutions to carry on the research and development required for this next challenging step in human cultural evolution: a reformation of understanding or doctrine, and its propagation, to make possible a union of the spiritual functions and wisdom of the past with today's cognitive knowledge and life problems.

Will this institution be among them? Who will take on responsibilities in this subtle yet vital movement toward the spiritual and moral advance of mankind? Religious institutions as well as individuals may adapt or reform to meet new requirements of the powers that in the end select the patterns of life.

#### NOTE

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